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Select Theme	: Sustainable and equitable farming systems
Endorsement email	:
Keyword 1	: Nutrient management
Keyword 2	: Sustainable intensification
Keyword 3	: Sustainable management practices
Title of Entry	: Effect of micronutrients on productivity and profitability of rice under three growing environments in Tanzania
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Nutrient deficiencies remain a major challenge in rice production in sub-Saharan Africa. Soil and foliar application of micronutrients along with macronutrients are likely to sustainably boost yields. Comparative data on efficiency and effectiveness of soil vs foliar-applied fertilizers, are scarce and inconclusive. Here we assessed the productivity and profitability of different soil- and foliar-applied micronutrients in 30 on-farm trials per year for two consecutive years (2015, 2016) in Tanzania. Five locally available foliar formulations (N-P-K-Zn-B-Mn-Cu) and soil application of micronutrients (SMN) (2-3-7.5-10 B-Zn-S-Mg

kg ha<sup>-1</sup>) were tested under two NPK-fertilized conditions (80-17-33 kg N-P-K ha<sup>-1</sup> and no-NPK) with two controls (no fertilizer and only NPK applied) in three rice production systems (irrigated lowland, rainfed lowland, and rainfed upland). The effect of foliar and SMN on yield was consistent in irrigated lowland but highly variable in rainfed and upland conditions across years. Hence, results across years were combined for the irrigated lowlands only. In irrigated lowland, NPK increased yield from 3.4 to 4.4 t ha<sup>-1</sup>, while additional SMN increased yield up to 5.0 t ha<sup>-1</sup>. With NPK, no significant yield increase was observed for the foliar products. The benefit-cost (B:C) ratio for SMN was 4, and one foliar product showed a higher B:C ratio than that of SMN without NPK application. In rainfed lowland, application of NPK alone increased yield in 2015 from 2.7 to 5.0 t ha<sup>-1</sup> while additional SMN further increased the yield to 6.8 t ha<sup>-1</sup>, with drought in 2016 likely nullifying the impact. With NPK, two foliar products increased yield significantly by 1 t ha<sup>-1</sup>, while none increased yields under no-NPK. The highest B:C ratio was obtained with SMN (B:C of 14), followed by two of the foliar products (11 and 7). In rainfed upland, no significant yield differences were observed among treatments in any year, likely due to drought. In conclusion, application of SMN and two foliar products increased yields and results in economic benefits under irrigated conditions and under rainfed lowland with no drought stress.

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